



First record of *Pentapycnon geayi* Bouvier, 1911 (Pycnogonida: Pycnogonidae) in the state of Ceará, northeastern Brazil

Soraya G. Rabay^{1,3}, Helena Matthews-Cascon¹ & Luis Ernesto Arruda Bezerra²

¹ Universidade Federal do Ceará, Centro de Ciências, Departamento de Biologia, Campus do Pici, Bloco 909, CEP 60455-760, Fortaleza, CE, Brazil

² Universidade Federal do Ceará, Instituto de Ciências do Mar, Av. Abolição 3207, Meireles, CEP 60165-08, Fortaleza, CE, Brazil

³ Corresponding author. E-mail: sgrabay@yahoo.com.br

Abstract: Contributions to the knowledge of the Pycnogonida fauna along the Brazilian coast are scarce. There are only 60 records for the coast of Brazil, and reports of this fauna are notably discontinuous. This is the first record of *Pentapycnon geayi* Bouvier, 1911 (Pycnogonida: Pycnogonidae) in the state of Ceará. This study adds a new bathymetric record and fills a gap in the distribution of *P. geayi* along the Brazilian coast. This report also provides important new data for Ceará because the diversity of Pycnogonida in this state is practically unknown.

Key words: geographical distribution; Chelicerata; Pantopoda; sea spiders

The Pycnogonida (sea-spiders) is an exclusively marine arthropod taxon with approximately 1,348 species distributed in eight families and 84 genera (ARNAUD & BAMBER 1987; MUNILLA 1999; ARANGO 2000, 2002). They are considered cosmopolitan arthropods, occurring from the tropics to the poles and from the intertidal zone to the deep sea (ARNAUD AND BAMBER 1987; MUNILLA 1999; ARANGO 2000, 2002). Most pycnogonids are commensal; they are associated with and feed on hydrozoans, anemones, bryozoans, small polychaetes, sponges, holothurioids, and sea stars (ARNAUD & BAMBER 1987; VEENA et al. 2008). Some pycnogonids are detritivores and others are parasitic on molluscs and hydrozoans (ARNAUD & BAMBER 1987; MÜLLER & KRAPP 2009).

The family Pycnogonidae Wilson, 1878 encompasses three genera: *Pentapycnon* Bouvier, 1910, *Pycnogonum* Brünnich, 1764, and *Pycnopallene* Stock, 1950 (BAMBER 2009). The genus *Pentapycnon* belongs to a group of polymeric pycnogonids that are characterized by one or two additional somites posterior to the fourth somite, and thus have five or six pairs of legs. The genus is composed of three species: *Pentapycnon bouvieri* Pushkin, 1993 and *P. charcoti* Bouvier, 1910 (Antarctic and Subantarctic regions), and *P. geayi* Bouvier, 1911 (Caribbean Sea to the Southwestern Atlantic Ocean) (BOUVIER 1911; HEDGPETH 1948; STOCK 1975, 1992; CHILD 1995; KRAPP & VIQUEZ 2011). The pres-

ent record of *P. geayi* is the first for the state of Ceará, and therefore fills a gap in this species' distribution along the Brazilian coast between the states of Pará and Rio Grande do Norte. It is also the first record of the family Pycnogonidae from Ceará.

The fieldwork took place at four beaches along the coast of Ceará, northeastern Brazil (Pacheco, Dois Coqueiros, Caponga, and Ponta Grossa beaches). Specimens were captured by hand by two persons for 1 hour (CPUE) in tide pools in the mesolitoral zone during spring low tides. In the laboratory, specimens were identified following the original description of BOUVIER (1911), and recent taxonomy and systematic group work using the current terminology (STOCK 1975, 1986, 1992; CHILD 1995; ARANGO 2000, 2002; BAMBER 2009; MUELLER & KRAPP 2009; KRAPP & VIQUEZ 2011), sexed, and measured to ± 0.01 mm with an ocular micrometer. The individuals were fixed in ethanol 70%, and deposited in the invertebrate collection of the Laboratório de Invertebrados Marinhos do Ceará (LIMCE-UFC), Universidade Federal do Ceará, in Fortaleza, state of Ceará, Brazil. All samplings in this study were conducted in compliance with current applicable federal laws (SISBIO 28854-1).

Five individuals (three males and two females) were collected at four beaches as follows: Pacheco beach, Caucaia (03°41'10.3"S, 038°38'23.8"W, one male (LIMCE-UFC 902), 4 mm, June 2010), Dois Coqueiros beach, Caucaia (03°41'26.6"S, 038°36'16.6"W, one female (LIMCE-UFC 903), 5 mm, 18 March 2015), Caponga beach, Cascavel (04°02'22.8"S, 038°11'30.3"W, one male, 5 mm, one female (both LIMCE-UFC 904), 5 mm, 3 July 2008); and Ponta Grossa beach, Icapuí (04°37'37.9"S, 037°30'17.1"W, one male (LIMCE-UFC 905), 4 mm, 9 September 2014).

According to BAMBER (2009), *Pentapycnon geayi* belongs to the superfamily Pycnogonoidea Pocock, 1904 and the family Pycnogonidae Wilson, 1878. The following description of *P. geayi* was based on the original description of BOUVIER (1911). The male of *P. geayi* has short, robust and stout body and legs with tegument strongly reticulate;



Figures 1–4. *Pentapycnon geayi* collected in Ceará, Brazil. **1.** Dorsal view of the female. **2.** Dorsal view of the male. **3.** Ventral view of the female. **4.** Ventral view of the male. LIMCE-UFC 904. Scale bar: 1 mm.

brownish cream in colour, trunk compact, fully segmented, with small granules in the cuticle and four strong tubercle dorsomedian placed directly posterior to ocular process (tubercle); proboscis conical, distally tapering; lateral processes or (crurigers) short touching at bases, or slightly apart almost touching, and its distal region has a margin with small tubercles; five pairs of legs, moderately short and robust; propodus with small single terminal claw and strong; ocular tubercle circular in dorsal view placed at middle region of cephalic, higher than other dorsomedian tubercles, four equidistant small eyes, darkly pigmented; abdomen horizontal, jointed from underneath the fifth segment; ovigers relatively small and short 7-segmented,

with strong, curved terminal claw. The female has the same morphological characteristics of the male, with the exception of the ovigerous that are exclusive of the males. In life, the individuals were brownish-cream in colour (Figures 1–4).

Pentapycnon geayi is similar to its Antarctic/Subantarctic congeners *P. bouvieri* and *P. chacorti*. However, *P. geayi* can be distinguished by the presence of the strongly reticulate tegument. *Pentapycnon bouvieri* and *P. chacorti* present the ocular tubercle placed at the extreme anterior edge of the cephalic segment, while in *P. geayi* the ocular tubercle is placed at the middle of the cephalic region. The ovigers in *P. geayi* are short, 7-segmented, and with a strong curved



Figure 5. Geographic range of *Pentapycnon geayi* Bouvier, 1911. Red symbols, new records. Blue symbols, previous records (STOCK 1975, 1992).

terminal claw, while in *P. bouvieri* and *P. chacorti* ovigers are 9-segmented, with a slightly curved terminal claw. In *P. geayi* the proboscis is conical and distally tapering, while in *P. bouvieri*, the proboscis is broadly tapering distally to a rounded oral surface, and in *P. chacorti*, the proboscis is a distally tapering cylinder bearing three rounded distal tubercles (CHILD 1995).

Pentapycnon geayi was previously recorded from Puerto Rico (HEDGPETH 1947), Costa Rica (KRAPP & VIQUEZ 2011), French Guiana (BOUVIER 1911), Suriname (STOCK 1975), and Brazil: Pará (STOCK 1975), Rio Grande do Norte (STOCK 1975), and Espírito Santo (STOCK 1992). The present study provides further records of *P. geayi* in northeastern Brazil. The closest record to the south is one female dredged by the Almirante Saldanha research vessel, station 1655; 06°04.7' S, 034°59.0' W; 25 m; 7 October 1967 (STOCK 1975), off the coast of Rio Grande do Norte state, 321 km from Ponta Grossa beach, Ceará. To the north, the nearest report is located off the coast of Pará state (STOCK 1975: 3 males, Almirante Saldanha, station 1763, 00°25.0' S, 047°17.0' W, 24 m, 8 November 1967), 1,024 km from Pacheco beach (Figure 5).

Until now, 38 nominal species were reported from tropical waters south of the mouth of Amazon and with 12 species known exclusively from Brazilian waters (MÜLLER & KRAPP 2009). *Pentapycnon geayi* is one of the 19 species shared between the Brazilian and Caribbean regions. According to MÜLLER & KRAPP (2009) the existence of a Brazilian faunal province appears rather probable, but more data are needed from this region to support this thesis. The present record of *P. geayi* in Ceará helps to better understand the fauna of the region and the zoogeography affinities as well.

One male from Ponta Grossa (Icapuí) was collected on the sand anemone *Actinostella flosculifera* (Le Sueur, 1817). The other specimens were found on tunicates, sponges, and macroalgae. Pycnogonids are almost exclusively free-living, errant invertebrates (BAMBER 2007), but some species are known to show preference either for seagrass stands or algal substrata in the mesolitoral and for coral

rubble habitats in the sublitoral, with some species showing preference for a specific substratum (sea weeds, coral rubbles) and others with no special preference (MÜLLER & KRAPP 2009). This is the first time that this species was found in association with other invertebrates, especially the sand anemone.

Pentapycnon geayi is the only species of the genus *Pentapycnon* recorded in Brazil. All previous records of the species by STOCK (1975, 1992) along the Brazilian coast involved material collected in deeper waters (15–25 m depth). Here *P. geayi* was recorded from depths of 0–2 m. All specimens were caught in tide pools in intertidal sandstone reefs during low tide, extending the bathymetric distribution shoreward for this species. Previous studies realized in other countries (French Guiana and Puerto Rico) showed that bathymetric distribution of *P. geayi* ranges from depths of 5–11 m (HEDGPETH 1947; KRAPP & VIQUEZ 2011).

The material of this study was collected in the intertidal zone, which indicates that the species has a broad bathymetric range, and could live in association with other invertebrates, such as the sand anemone *Actinostella flosculifera*. This is the first record of the species in the state of Ceará, thus filling a gap in its geographic distribution in the Western Atlantic.

ACKNOWLEDGEMENTS

The authors thank Dr. Sergio Stampar (Universidade Estadual Paulista Júlio de Mesquita Filho, Campus de Assis) for identifying the sand anemone. We would also like to thank Felipe Monteiro (Instituto Federal de Educação, Ciência e Tecnologia do Ceará, Campus Jaguaribe) for photographing the specimens and Paulo Pachel (Museu de Zoologia da Universidade de São Paulo) for his help with the distribution map.

LITERATURE CITED

- ARANGO, C.P. 2000. Three species of sea spiders (Pycnogonida) from Santa Marta, Colombian Caribbean. *Boletín de Investigaciones Marinas y Costeras — INVEMAR* 29(1): 59–66. <http://ref.scielo.org/t2zhqk>
- ARANGO, C.P. 2002. Morphological phylogenetics of the sea spiders (Arthropoda: Pycnogonida). *Organisms Diversity & Evolution* 2(2): 107–125. doi: [10.1078/1439-6092-00035](https://doi.org/10.1078/1439-6092-00035)
- ARNAUD, F. & R. BAMBER. 1987. The biology of Pycnogonida. *Advances in Marine Biology* 24: 1–96. doi: [10.1016/S0065-2881\(08\)60073-5](https://doi.org/10.1016/S0065-2881(08)60073-5)
- BAMBER, R. 2007. A holistic re-interpretation of the phylogeny of the Pycnogonida Latreille, 1810 (Arthropoda). *Zootaxa* 1668: 295–312.
- BAMBER, R. 2009. Pycnogonidae Wilson, 1878. Pycnobase: world Pycnogonid database. Accessed at <http://www.marinespecies.org/pycnobase/aphia.php?p=taxdetails&id=1567>, 28 January 2016.
- BOUVIER, E.L. 1911. Observation sur les Pycnogonomorphes, etc. *Comptes Rendus de l'Académie des Sciences* 152: 491–494. <http://biodiversitylibrary.org/page/7156482>
- CHILD, C.A. 1995. Antarctic and Subantarctic Pycnogonida V. The families Pycnogonidae, Phoxichilidiidae, Endeididae, and Callipallenidae, including the Genus *Pallenopsis*. *Antarctic Research Series* 69: 113–160. doi: [10.1002/9781118668252.ch3](https://doi.org/10.1002/9781118668252.ch3)

- HEDGPETH, J.W. 1948. The Pycnogonida of the western North Atlantic and the Caribbean. Proceedings of the United States National Museum 97(3216): 157–342. <http://www.biodiversitylibrary.org/part/52637>
- KRAPP, F. & C. VIQUEZ. 2011. Pycnogonida from Costa Rica collected by scuba diving. Cuadernos de Investigación — UNED 3(2): 203–207. <http://investiga.uned.ac.cr/revistas/index.php/cuadernos/article/view/149/41>
- MÜLLER, H.G. & F. KRAPP. 2009. The pycnogonid fauna (Pycnogonida, Arthropoda) of the Tayrona National Park and adjoining areas on the Caribbean coast of Colombia. Zootaxa 2319: 1–138.
- MUNILLA, T. 1999. Evolución y filogenia de los picnogónidos. Boletín de la Sociedad Entomológica Aragonesa 26: 273–279.
- STOCK, J.H. 1975. Biological results of the University of Miami Deep-Sea Expeditions. 108. Pycnogonida from the continental shelf, slope, and deep sea of the Tropical Atlantic and east Pacific. Bulletin of Marine Science 24: 957–1092.
- STOCK, J.H. 1986. Pycnogonida from the Caribbean and the Straits of Florida. Bulletin of Marine Science 38(3): 399–441.
- STOCK, J.H. 1992. Pycnogonida from southern Brazil. Tijdschrift voor Entomologie 135: 113–139. <http://biostor.org/reference/50002>
- VEENA, S., P. KALADHARAN, P. ROHIT & G.S. RAO. 2008. The pycnogonid (*Endeis mollis* Carpenter, 1904) associated with hydroids from the inshore waters of Visakhapatnam, India. Journal of the Marine Biological Association of India 50(1): 17–22. <http://eprints.cmfri.org.in/id/eprint/2220>
- Authors' contributions:** SGR collected the data, identified the specimens, and drafted the manuscript. HMC and LEAB participated in its design and coordination and helped to draft the manuscript.
- Received:** 1 July 2016
- Accepted:** 29 March 2017
- Academic editor:** Regiane Saturnino